

PATENT CLAIMS

1. Enamel-free paste with a matrix on the basis of a Si-polymer that can be obtained by the hydrolysis and condensation of at least one silane of general formula $R_xSi(OR')_{4-x}$ with at least one polysiloxane of general formula $[R_2SiO]_y$, or $R_3Si-(O-SiR_2)_y-O-SiR_3$, respectively, wherein:
 - the radicals R can independently be alkyl, aryl, arylalkyl, alkylaryl or H;
 - the radicals R' can independently be H, methyl, ethyl, n- or i-propyl, n-, iso-, sec- or tert-butyl;
 - x represents 0 or 1 (for the first silane);
 - x represents 0, 1, 2, 3, or 4 (for each subsequent silane); and
 - y represents a whole number, which is at least 2 and can be approximately infinite; wherein the paste additionally is comprised of a high-boiling organic solvent with a boiling point of 100°C or above, and a pigment as the solvent, but no alcohol with a boiling point of below 100°C.
2. The paste according to claim 1, wherein x represents 1 for the first silane.
3. The paste according to claims 1 or 2, wherein the total content of the paste of water and alcohols with a boiling point of below 100°C, based on the total mass of the paste, is less than 5%.
4. The paste according to one of the previous claims, wherein the pigments are temperature resistant inorganic pigments.

5. The paste according to one of the previous claims, wherein the temperature resistant inorganic pigments are graphite or TiO_2 .
6. The paste according to one of the previous claims, wherein the paste is further comprised of dispersed nanoparticles, preferably in the form of the oxides of Si and Al, and/or a catalyst, which has initiated the hydrolysis and condensation of silane(s) and polysiloxane(s).
7. The paste according to one of the previous claims, wherein the paste is additionally comprised of a thickener, or a thixotroping agent, respectively.
8. The paste according to one of the previous claims, wherein R' represents H, methyl, or ethyl.
9. The paste according to one of the previous claims, wherein the at least one silane is methyl triethoxysilane and tetraethoxysilane.
10. A method for the production of the paste according to one of the previous claims, wherein the method comprises the steps of
 - (e) converting at least one silane of general formula $\text{R}_x\text{Si}(\text{OR}')_{4-x}$ via hydrolysis and condensation with at least one polysiloxane of general formula $[\text{R}_2\text{SiO}]_y$, or $\text{R}_3\text{Si}-(\text{O}-\text{SiR}_2)_y-\text{O}-\text{SiR}_3$, respectively, wherein: R, R', x, and y are defined as outlined in claim 1;
 - (f) adding at least one pigment (i.e. hydrolysis and condensation may proceed in the presence of the pigment, but the pigment can also be added afterwards) to the mixture in, or of step (a);

- (g) adding a high-boiling organic solvent with a boiling point of at least 100°C to the mixture of step (a), or (b), respectively;
 - (h) removing the water/alcohol formed during hydrolysis and condensation from the mixture obtained in step (c).
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- 11. The method according to claim 10, wherein the hydrolysis and condensation in step (a) occur in the presence of a thickener, or thixotroping agent, respectively.
 - 12. The method according to claim 10, wherein the thickener, or the thixotroping agent, respectively, is added after the hydrolysis and condensation of step (a).
 - 13. The method according to one of the claims 10 to 12, wherein the hydrolysis and condensation in step (a) occur in the presence of a catalyst.
 - 14. The method according to one of the claims 10 to 13, wherein the hydrolysis and condensation in step (a) occur in the presence of a finely dispersed filler.
 - 15. The method according to one of the claims 10 to 13, wherein the finely dispersed filler is added after the hydrolysis and condensation of step (a).
 - 16. The method according to one of the claims 10 to 15, wherein the removal of the water/alcohol formed in step (a) occurs by means of distillation or by means of precipitation of the binder phase formed in step (a).

17. The method according to one of the claims 10 to 16, wherein step (c) occurs before step (d).
18. Silkscreen process for the application of decorative prints on glass to be thermally stressed, characterized in that the paste according to one of the claims 1 to 9 is applied onto the glass to be decorated, and together with the glass is subjected to a thermal burning-in.
19. The method according to claim 18, wherein the burning-in occurs at 250-280°C.
20. The method according to claims 18 or 19, wherein the burning-in is preceded by a drying step at 150 to 180°C in order to remove the high-boiling organic solvent, as well as possibly the thickener, or the thixotroping agent.